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Target tissue influence on somatostatin expression in the avian ciliary ganglion.

In birds, the ciliary ganglion contains two distinct populations of neurons: ciliary neurons, that innervate the striated muscle of the iris and ciliary body; and choroid neurons, that innervate vascular smooth muscle in the choroid layer of the eye. Both types of neurons utilize acetylcholine as a small molecule neurotransmitter, but only those neurons which innervate the vascular choroid layer, the choroid neurons, use somatostatin as a peptide co-transmitter. Both ciliary and choroid neurons share a common neural crest origin, have the same source of preganglionic input, and develop within the same ganglionic environment. We have therefore concentrated on examining the influence of choroidal vascular smooth muscle cells in regulating the differential expression of somatostatin in the ciliary ganglion.

These studies indicate that expression of the neuropeptide transmitter somatostatin in cultured ciliary ganglion neurons depends upon an interaction with target choroid layer cells. This cell-to-cell interaction is mediated by a diffusible factor which can induce somatostatin expression even in the ciliary neurons which would not normally express somatostatin (Coulombe and Nishi, (1991) *J. Neurosci.* 11(2), 553-562). Recently we have identified the chemical mediator of this interaction. This previously known protein is called activin and is produced and released in culture by cells derived from the choroid layer. Activin affects neurotransmitter expression in a manner appropriate to the pattern of neurotransmitter expression found in vivo and is produced by cells derived from the appropriate target tissue(Coulombe et al,(1993) *Neuron* 10, 899-906).

From these results we hypothesize that somatostatin expression is regulated in developing ciliary ganglion neurons in vivo by activin released from choroid cells, the targets of somatostatin expressing neurons in the ciliary ganglion.

As a means of testing this hypothesis our current research is focused on determining the spacial and temporal pattern of expression for activin within the eye, and in identifying and examining the expression of activin receptors within the ciliary ganglion. In addition, we are also working to further define activin's effects on neurotransmitter expression and differentiation in other neurons of the peripheral nervous system.

Source: https://www.industrydocuments.ucsf.edu/docs/zqcb0000